CE Delft

Committed to the Environment

Halving carbon emissions in the built environment

A review of nine policy options

Summary

Importance of carbon cuts in the built environment
Energy use in the built environment accounts for around 30% of total Dutch fossil fuel consumption (including indirect consumption via the power grid). As a result, this sector will play a significant part in achieving long-term sustainability of the country's energy economy and reducing CO_2 emissions by 80-95% by the year 2050 – the cuts required to secure the target of limiting global warming to 2°C, as laid down in the Copenhagen accord.

Current policies inadequate
Despite market-based efforts and government policies, over the past few decades fossil energy consumption in the built environment has continued to rise. Although the amount of gas burned for space heating fell per dwelling, mainly as a result of insulation measures and introduction of high-efficiency boilers, aggregate consumption for this purpose remained virtually unchanged, because of net growth of the housing stock. Over the same period household electricity consumption rose substantially.
This meagre result has involved major efforts on the part of government as well as energy utilities, contractors, housing corporations and other parties. In the Netherlands the main policy instruments employed to this end have been the 'ecotax', supported by efficiency standards for new buildings, the 'energy rebate scheme' and, for small and medium-sized enterprises, a tax deduction for energy investments (EIA), renewable energy subsidies (MEP and SDE) and mandatory provisions under the Environmental Control Act. While these measures have managed to temper the growth of aggregate CO_2 emissions, though, they are proving inadequate for securing the climate targets set by the government for 2020 and moving towards truly substantial CO_2 emission cuts (relative to 1990) in the longer term. Despite all these efforts, there is too little incentive for households and energy consumers in utility buildings to overcome their resistance to reducing their energy consumption.

Project scope
This project focuses mainly on the (institutional) barriers standing in the way of effective policies in this realm. The following key questions are addressed:
- How can the instruments employed for shaping energy efficiency policy in today's built environment be improved? Where are the opportunities and what are the constraints, in both administrative and social terms?
- Is more 'command and control' policy the solution? If so, what are the problems involved in implementing such policy?
- What is the role of local and provincial authorities in rolling out national energy efficiency policies in today's built environment?

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CE Delft has already carried out a number of studies on policy options for the built environment, leading the Netherlands Environmental Assessment Agency (PBL) to commission CE Delft to conduct an inventory review with the following core objective.

To assess the potential and the limitations of nine policy options for achieving robust CO_2 emission cuts (at least 50% in 2030 relative to 1990) in the built environment.

Research methodology and report structure

This report starts out with a brief description of the scope of the 'built environment' sector, going on to examine its energy characteristics and current CO_2 emissions. A number of problematical issues in the built environment are then explored, based on previous studies by CE Delft and several other sources. Proceeding from this analysis, criteria are then formulated for evaluating new efficiency policies for the sector. Based on the same analysis, augmented by the expertise available at CE Delft and the Platform for Energy Conservation in the Built Environment (PeGO), nine potential policies are then defined with which far-reaching CO_2 cuts can be secured. These vary in their robustness and thus also in their impact in social and administrative terms and their efficacy. The core objective of the study was to assess each of these nine policies according to the set criteria. A two-track assessment methodology was adopted. Based on an analysis of previous research, particularly empirical studies, what conclusions can be drawn with a fair degree of certainty? This desk study was then complemented by two electronic surveys to establish mainstream expert opinion on these policies.

Conclusions and recommendations

Overcoming resistance

In the Netherlands the built environment (housing and utilities, gas/heat/power consumption) emits around 64 Mt CO_2 per annum. The aim of this study was to investigate what basket of government policies could reduce this figure by 50%. Abatement options fall into basic five categories:

- Reducing demand ('needs');
- Savings through behavioural change;
- Improving the efficiency of appliances and installations;
- Improving the efficiency of buildings;
- Reducing the carbon content of energy carriers.

As the literature shows, many technically feasible options are not currently being exploited, even though that would save building owners and users money. This is due to a deficit with respect to three factors:

- A **desire** to expend efforts on reducing one's energy consumption;
- **Knowledge** about potential measures and their impact on one's energy consumption;
- **Ability:** the power of building users to implement certain measures (insulation, high-efficiency boilers, etc.), as well as the availability of funds to invest in them.

Reinforcing measures on the part of government can convince/compel energy consumers to implement abatement measures. To achieve the target of 50% CO_2 reduction requires effective policy instruments that overcome resistance. In the process, measures will also have to be taken that cost more than they bring in in terms of fuel savings – measures, therefore, that will invoke even more resistance than current policies.

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Core policies
For effective CO_2 abatement policy in the built environment, nine policies are described that can each secure a substantial portion of the envisaged CO_2 cuts. The quantitative scope of these policies varies from 25% to 100% of these cuts. This means they cannot all be used to achieve the target of 50% reduction.

Flanking policies
It is above all the *'desire'* of energy consumers that is amenable to government policy, whether through persuasion (subsidies, tax schemes), necessity (efficiency standards), or higher prices (climate budget, carbon tax).
Issues relating to *'knowledge'* can be addressed primarily through flanking measures like government information campaigns, as well as similar activities on the part of energy companies, contractors and so on.
Problems regarding '*ability*' have meanwhile been largely, but not fully, resolved through a revision of relevant regulations (including changes to the dwelling valuation system to do away with the 'split incentive'). An important auxiliary instrument geared to *ability* is creation of appropriate funding channels via banks, local authorities and so on. While indispensable, though, this measure is not in itself sufficient.

Desk study analysis
- When it comes to policy efficacy, it should be borne in mind that this is the sum of scope (which policies are rolled out) and effectiveness (determined largely by actual policy design). On this basis, three of the nine policies are sufficient to secure the target of 50% emissions reduction.
- The costs to society and to the government vary widely, depending on the policy.

Survey results on assessment of core policies
From the electronic surveys carried out as part of the study the following results emerged:
- Efficacy, feasibility and support base are the principal criteria for evaluating the policies, with government costs and social costs acting as key constraints.
- Support is highest for energy efficiency standards for installations, for subsidies and for fiscal measures. On a 1-to-10 scale these score between 6.6 and 7.4. In both surveys support for the policy 'Personal climate budget' was low, scoring only 3.6. Support for the other measures was moderate.
- On the criterion of feasibility, the policy 'Personal climate budget' again scored low. In this respect respondents saw most in the feasibility of subsidies, fiscal measures and efficiency standards for installations.

Surprisingly, the survey results vis-à-vis policy efficacy and costs were in marked deviation from the information retrieved in the desk study. This was due on the one hand to the survey being considered too difficult by the respondents, with insufficient explanatory information given, and on the other to the fact that the issues are too complex for a 15-minute survey.
The following policy options are available for securing 100% CO_2 reduction:
- Mandatory carbon efficiency standards for energy carriers;
- Climate budget, personal;
- Climate budget, general;
- Carbon tax on energy carriers.

Three other policies are available for securing slightly more modest CO_2 cuts than the envisaged 50%:
- 'White certificates';[1]
- Government subsidies;
- Fiscal incentives.

These are all accompanied by high social costs: the costs associated with persuading people to adopt a particular course of action).

Evaluation on the other criteria varies considerably, with the support base appearing to be inversely proportional to efficacy/costs.

Conclusion

There is already considerable resistance to implementation of CO_2 abatement measures and this will be even greater if a 50% reduction is to be achieved. The present study was limited in scope and in scale. It would therefore be useful to undertake a more in-depth analysis of the intricacies of this resistance and, above all, the extent to which it might be successfully overcome by the various policies.

The study gave no consideration to the time required to achieve the total potential savings. In practice it may be very effective to combine a policy that is widely supported yet not highly effective with one that enjoys less support but is more effective. Such combinations were not examined in present study.

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[1] A mandatory reduction target for each individual energy supplier (for example), to be secured through certified reductions obtained through energy savings by end users. These certificates are tradable. Example: the UK Carbon Emission Reduction Target (CERT).